

*Landscapes of Care. Public housing across multiple
geographies: crossing theories and practices*



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The Impact of care: Expanding Architectural education through Community Design-Build Projects

James Doerfler

Abstract:

The influence of community-centered design and design-build projects on architectural education has increased in the last decade. Including student-led community-engaged projects in the curriculum of architecture schools has shaped architectural education and influenced the profession. These projects provide a service to communities or non-profit organisations in need of design solutions. Engaging social responsibility and public interest design represents an ideological shift in the way that architecture schools are approaching education. There is often an intersection of public interest design and design-build in these projects. This paper explores the question, can an academic community-based design-build project provide a new transitional housing prototype for the homeless? And, do these projects fulfil the needs of students to provide effective learning experiences for promoting their desire to promote communities they serve?

Architecture schools provide learning experiences through various initiatives. For example, Yale University's "The Yale Building Project,"¹ Auburn University's "Rural Studio"² and University of Kansas "Studio 804"³ have had long-running public interest design studios. These design-build initiatives educate students outside the typical design studio. This article will provide an overview of public interest and design-build education in the United States to provide context for introducing this into the curriculum at an Australian university.

The Prefab 21 design-build studio is a partnership between the Deakin University School of Architecture and Built Environment, FormFlow, and Samaritan House, a shelter for homeless men, that focuses on the design and fabrication of a prototype house. This transdisciplinary project was accomplished in design studio and workshop sessions that designed, documented, and built an Independent Living Unit (ILU) and created a microvillage of seven ILUs at Samaritan House. This prototype has an extensive impact through it providing a new typology for transitional homeless accommodation and jobs in the region.

Keywords: design-build; community-engaged; architectural education; prefabrication; homelessness.

James Doerfler is currently Visiting Faculty in Architecture at Auburn University. James previously served as a Professor and Chair in Architecture at Deakin University, Australia. Throughout his career, he has designed new curricula for architecture programs in the US and Australia and led interdisciplinary research projects on topics including façade design and technology, high-performance building, prefabricated building systems, design-build, mass timber design, and sustainable water projects. James has led interdisciplinary classes and his innovative teaching and research have been presented at national and international conferences. These classes have received numerous awards and grants. James has served in leadership roles at the University of Technology, Sydney, Cal Poly San Luis Obispo, and Thomas Jefferson University in Philadelphia. He is a founding board member of the Façade Tectonics Institute and the International Association of Structures and Architecture and has served on the board and is the past president of the Building Technology Educators Society.

Introduction

Since the late 1960s the expansion of the architecture curriculum being taught in architecture schools has grown to include the relationship of community-engaged projects, also called public interest design, and design/build. These are two different pedagogical approaches to teaching a pragmatic aspect of architecture. The degree to which they overlap occurs across a spectrum in different architecture schools throughout the world.

Students today are increasingly eager to make a positive impact on the communities they are part of and are looking for ways to align their education and career skills with these goals. Arguably, the current generation of students is highly motivated to contribute to society¹, seeking to combine meaningful social impact with a more advanced professional skill set through such projects. The design-build educational model represents a fusion of two stages of an architectural project, with the same team involved in both stages. This approach offers a comprehensive and integrated experience that encompasses both theoretical knowledge and practical application.

This article provides a brief historical overview of design-build philosophy and pedagogy related to community-engaged projects and examples of design-build education in the United States. The case studies of the successful aspects of these examples of design-build pedagogy in the U.S. form the basis for taking what was learned and translating it to an Australian university. This article connects the development of a design-build pedagogy to students and faculty engaging in public interest design as a methodology for expanding experiential curricula in architecture schools in other countries. The goal is to create community-based projects that provide new homes and buildings for marginalized populations, positively impacting the local community. The primary methodology for this process is hands-on education, involving students, under

¹ Jean M. Twenge, *iGen: Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy—and Completely Unprepared for Adulthood—and What That Means for the Rest of Us* (New York: Atria Books, 2018)

faculty supervision, in the design and construction of a permanent building. This practice differs from prototype, model-making courses, or internships. The full-scale project is designed with direct client interaction and an understanding of the needs of the real stakeholders. The project is built with the inherent constraints of the building site and budget, using appropriate construction methods and available materials. It provides a valuable and holistic experiential learning experience. The research and exploration structured into the academic experience is a strongway of providing a new perspective on the transitional housing typology. Neither the client, builder, faculty, or students had previously designed or built transitional housing. This project was an experiment in the process of creating transitional housing and providing an outcome that would respond to the needs of this community. This article explores the question, can an academic community-based design-build project provide a new transitional housing prototype for the homeless? And then, do these projects fulfil the needs of students to provide effective learning experiences to supporting the communities they serve?

The focus for the Australian project providing transitional housing for the homeless fits the theme of this journal, *Landscapes of Care. Public housing across multiple geographies: crossing theories and practices on public housing*. This project questions the typical practices of providing crisis housing for the homeless. Moving beyond the night-by-night crisis accommodation as a short-term fix, this project creates a new vision for delivering a strategy of care and providing a supportive environment of teaching and learning skills for homeless people in addition to a medium to long-term approach to accommodation and the creation of a stable living environment for the occupants. This ongoing support over months breaks patterns of homelessness and creates a strategy for transitioning out of the homeless cycle. This is a pilot project that has a vision of transforming lives.

Background of Community-Centered Design-Build Projects

The connection of theory and practice not only makes the former concrete and understandable but prevents the manual work from being routine and narrow.²

The concept of Design-Build has been a longstanding tradition in architectural education. In the past, the same individual was responsible for both designing and constructing buildings. This integration of design and building within the role of a master builder was a fundamental aspect of construction for many centuries. However, as theoretical design took precedence from the time of Alberti through the Enlightenment, industrial revolution, and modernism, the master builders and craft guilds gradually became a distant memory. During this period, architects prioritized theoretical design over materiality and craft. In education, the mechanical arts became the legacy of the master builder and guild system, while elite American institutions

2 John Dewey and Evelyn Dewey, *Schools of Tomorrow* (New York: E.P. Dutton & Company, 1915), 278

focused on the liberal arts as the framework for learning, thereby creating a separation between the applied sciences and classical studies and theory.

By the end of the 19th Century educators, such as John Dewey, explored aspects of the vocational combined with general education to promote a broader intellectual exploration for students. Dewey's philosophy of pragmatism coupled with his support of "learning-by-doing" curricula became an educational methodology. In Dewey's book, *Schools of Tomorrow*, we see a discussion of the value of learning both inside and outside the classroom. In one school mentioned in the book, the buildings were built by the students, getting experience in drawing plans, digging and laying the foundations, providing carpentry, and painting the structure. Dewey suggests that educators harnessing the "students' natural curiosity and love of action" are better placed to focus on "useful problems."³

Joan Ockman observes, American Pragmatism as a movement waxed and waned over the 20th Century. There are connections between pragmatism and the development of modern architecture, that involved both American and European sources. Applications of a form of pragmatism in the curricula of the Bauhaus that circle back to the US with the immigration of many Bauhaus faculty to the US in the 1930s. After the Second World War pragmatism waned in the face of different philosophies and the development of post-modernism.⁴ In 2000, the Buell Center at Columbia University hosted two events that captured how pragmatism was viewed at the end of the 20th Century. The turn of the century interpretation of pragmatism has led to the inclusion of design research projects that provide measurable results with words like "performativity, implementation, risk analysis" becoming the language of studying design-build. Using these terms is moving design-build research into the fact-based side of research. But at its fundamental core pragmatism is about "hands-on [sic] experience, trial and error experimentation, innovation, and an open-ended future."⁵

The influence of these pragmatic community-engaged design-build projects on architectural education has increased in the last decade. This has influenced the acceptance of these projects as design research for faculty. Including faculty-guided, student-led community-engaged projects in the curriculum of architecture schools has shaped architectural education and influenced the profession. Through combining the learning experiences of community engagement, public participation, and multifaceted requirements that explore the full services that architects provide, these projects provide a service to underrepresented communities or non-profit organisations in

3 Dewey and Dewey, *Schools of Tomorrow*.

4 Joan Ockman, "Pragmatism/Architecture: The Idea of the Workshop Project," in *The Pragmatist Imagination: Thinking About 'Things in the Making'*, ed. Joan Ockman (New York: Princeton Architectural Press, 2000)

5 Joan Ockman, "Consequences of Pragmatism: A Retrospect on 'The Pragmatist Imagination,'" in *The Figure of Knowledge: Conditioning Architectural Theory, 1960s–1990s*, ed. Hilde Heynen, Rajesh Heynickx, and Sebastiaan Loosen (Leuven: Leuven University Press, 2020)

need of design solutions. Engaging social responsibility and public interest design represents an ideological shift in the way that many architecture schools are approaching education. There is often an intersection of public interest design and design-build in these projects.

The architecture curriculum provides one of the few truly integrated pedagogical frameworks that spans theory to practice. The design studio is the focus of architecture education, providing the focal point in most architecture curricula for the integration to occur. The design studio is an example of active learning. It teaches a process for each student to “find” the parameters of the assigned project through research, investigation, iteration of strategies, and interaction with the client or community who are the focus of the design.

The 1996 report about architecture education and practice, *Building Community: A New Future for Architecture Education and Practice*, authored by Ernest Boyer and Lee Mitgang, includes mention of design-build as an excellent approach to the report’s goal of creating a “connected curriculum” through integrating the subdisciplines of architectural education. Professor Bruce Meyer from Ball State University states that design build provides the setting for students to be “total architects” by emulating the profession. This is done by working in teams, practicing communication skills, negotiating, and following a project through to completion provides integration of knowledge.⁶

Another goal described in the Boyer Report is “service to the nation,”⁷ to improve community-minded scholarship in the curriculum. The report challenged architecture schools to “elevate the concept of service to the nation.”⁸ Students and faculty engaged in civic activism should be seen as a prelude to professional engagement. The Boyer Report’s promotion of service and community-based projects in the curriculum of schools nationwide reminded schools of the importance of the inclusion of outreach programs for both the university and student educational experiences. In 2012, the Association of Collegiate Schools of Architecture (ACSA) added Design-Build to their Architecture Education Awards in recognition of the increased prominence. The ACSA webpage describes this award and provides a formalized design-build acknowledgment of the importance of this a method for sharing innovative curricula across the member schools. The Design Build Exchange was formed by a group of like-minded educators, that has now become a worldwide platform for academics and non-academics to share ideas and resources.⁹ There are currently 99 organizations listed as members. Most architecture schools in North America have some type of design-build student experience.¹⁰

6 Ernest L. Boyer and Lee D. Mitgang, *Building Community: A New Future for Architecture Education and Practice; A Special Report*, 2nd ed. (Princeton, NJ: Carnegie Foundation for the Advancement of Teaching, 1996)

7 Boyer and Mitgang, *Building Community*.

8 Boyer and Mitgang, *Building Community*.

9 “DesignBuildXchange,” accessed March 1, 2024, <https://www.dbxchange.eu>.

10 Chad Kraus, “Introduction: Hands On, Minds On,” in *Designbuild Education*, ed. Chad Kraus (New York and London: Routledge, Taylor & Francis Group, 2017).

Three examples of Design-Build from the United States pedagogy in Connecticut, Alabama and Kansas

In the following section, we will delve into three specific design-build programs in the U.S.. Beginning in 1967, the Yale First Year Building Project is the first of these programs. Other subsequent programs have succeeded and failed at various schools. Despite sharing similar overarching pedagogical objectives, these programs demonstrate distinct approaches in their project execution.

In 1967 the Yale School of Architecture began the Yale Building Project, a mandatory design-build program for all first-year postgraduate Masters of Architecture students. This program offered students the opportunity to design and build a building in an underprivileged community. The Chair in Architecture, Charles W. Moore, founded the First-Year Building Project by developing student-led initiatives into a commitment to community-based and socially responsive design. These projects aligned with Moore's educational views and were also a reflection of the late 1960's awakening to social activism in the U.S., thereby. Paralleling the community-based initiatives of President Johnson's "Great Society," the Yale Building Project is a commitment to the "direct involvement of students in real-world problems."¹¹

Moore's pedagogical position was to have the students understand the importance of collaboration combined with social involvement, an ambition the students also sought. Moore supported this student-led movement "to make design more responsive to the complex needs around us."¹² This transformation of architecture pedagogy was based on Moore's approach to architecture with the use of simple forms and basic technologies in projects such as Sea Ranch. The students were encouraged to embrace this vocabulary and learn the process of building at this scale. The project was chosen based on the criteria the students and faculty created for community impact in a poor community and being buildable in the time available.

It is interesting to note that the first projects were located outside of New Haven in Appalachia, a far distance from the Yale campus. This which posed extra challenges due to the remoteness from campus of the projects and available housing for the students. In the 1970s and 1980s several camp buildings and pavilions in rural Connecticut were the focus of the studio. Off-campus locations meant the students would move to the site for periods and live with local families or camp out in temporary shelters.

¹¹ Richard W. Hayes and Robert A. M. Stern, *The Yale Building Project: The First 40 Years* (New Haven, CT: Yale University Press, 2007)

¹² Hayes and Stern, *The Yale Building Project*

As the Yale First Year Building Project moved forward into the 1990s, the projects became local and focused on the City of New Haven. Partnerships were made with Habitat for Humanity, Neighborhood Housing Services, Common Ground, NeighborWorks New Horizons, Columbus House, and Friends Center for Children. This has created a focus on affordable housing, replacement, and infill. The First Year Building Project is now connected to community development and neighborhood improvement in challenged districts of New Haven. The student-designed houses become the touchstones of the improving neighborhood.¹³

Expanding on the experiments at Yale, Auburn University's Rural Studio is in Newbern, Hale County in rural West Alabama. Newbern is two and a half hours from the Auburn Campus. Since 1993, Rural Studio has called Newbern home. Almost all the projects of Rural Studio have been done within a 25-mile radius of Newbern. Faculty that teach at Rural Studio also live there. The over forty students who participate in the program each year live there for one or two semesters or longer. In addition to taking classes, the students have local jobs, tutor at the local school, go to the local churches and play on the local sports teams. Rural Studio has immersed itself in the community of Hale County.

Founding directors Samuel Mockbee and D.K. Ruth were driven by the moral responsibilities of architecture. Mockbee's concept of "citizen architect" placed architects as leaders to bring about environmental and social change. He believed that architectural education should be hands-on, building for real clients in their communities. In Newbern, Rural Studio has become the town architect.¹⁴

Cultivating the relationships that have existed in Hale County for over thirty years has built trust in the community. Rural Studio began by designing and building houses and small community buildings. Over time the buildings have become larger and more complex projects. The current director, Andrew Freear, has guided civic projects including a fire station, library, boys and girls club, and a museum. The local government trusts Rural Studio to provide buildings to service the community and provides money and support to develop and build the projects. When working on complex projects, Rural Studio has often collaborated with other professionals and incorporated their work into the projects.

Rural Studio projects are an example of American pragmatism, the expression of practical solutions and self-reliance. The use of found materials in Mockbee's projects and the stripped-down necessity of Freear's projects show this pragmatism. The needs of the community have shifted from early projects questioning what *can* we build, to what *should* we build. This demanded a strategy for programming building uses and providing long-term plans for projects.

13 Hayes and Stern, *The Yale Building Project*

14 Andrew Freear, Elena Barthel, Andrea Oppenheimer Dean, and Timothy Hursley, *Rural Studio at Twenty: Designing and Building in Hale County, Alabama* (New York: Princeton Architectural Press, 2014)

The mission for Rural Studio has expanded to research other opportunities for underserved rural communities. Since 2005, a cohort of students each year has explored the *20K House Program*, an affordable house that can be built by local builders for \$20,000, including materials and labor. Part of this program is to cultivate a local workforce to build these houses to replace the dilapidated local housing stock. Another project is the Rural Studio Farm. Before the farm, it was easier to get processed and pre-packaged food than it was to get fresh food despite being in a rural farming region. The project demands the collaboration of botanists, horticulturalists, and biologists to provide productive soil and the care needed to produce food.¹⁵

The learning process at Rural Studio includes a dedicated group of Auburn University faculty and staff and many collaborators who are both local and nationally recognized. Architects, engineers, and other specialists generously donate their time and serve as team members and reviewers on projects. The collaborators are encouraged to be proactive and equal team members contributing to the projects. This emulation of professional interdisciplinary teams is an additional learning opportunity for the students to experience.¹⁶

"While design-build education is not solely focused on design, it is equally not really about building. I doubt anyone involved in this considers design-build education to be vocational in any way...Students are most empowered by having experienced the intertwined relationship between designing and building, the mind and the hand."¹⁷

Studio 804 at the University of Kansas was founded in 1995 by Dan Rockhill to engage his students in the final design studio in the curriculum. Rockhill observed that students had "one foot out the door," and he wanted them to have a passionate outlet for their final design experience in school. The design-build project was this vehicle to get the students enthusiastic about the design studio. The early projects were small affordable houses in marginal neighbourhoods close to campus. These first projects had the students find the property and sought the funding. The projects were seeded through the neighborhoods bringing change and solutions to the housing problems the city faced.

The funding for these projects in the early years was obtained every year from loans from neighborhood associations and the cost would be recouped by selling the house. By 2009, Studio 804 became self-funded, by incrementally saving over the years to create their own development funds for their projects. They now use the funding from Studio 804 Inc., a non-profit, to purchase the property, finance the house, and generate enough savings for the next project. The business side of Studio 804 also provides another area of learning for the students

¹⁵ Freear et al., *Rural Studio at Twenty*.

¹⁶ Freear et al., *Rural Studio at Twenty*.

¹⁷ Chad Kraus and Dan Rockhill, "Work Ethic, Ethical Work: A Conversation with Designbuild Pioneer Dan Rockhill," in *Designbuild Education*, ed. Chad Kraus (New York and London: Routledge, Taylor & Francis Group, 2017), 227

and is an example of establishing similar non-profit community-based architecture practices. Studio 804 is the designer, builder, and developer of their projects.¹⁸

The work of Studio 804 is driven by a strong conceptual framework around sustainability. Passive environmental strategies are where the design starts. Connections to the landscape and an understanding of the culture of Kansas, its prairie location of long horizons, agricultural buildings, and experimenting with materials that may be repurposed are hallmarks of the design approach. Being resourceful and reusing materials is both sustainable and efficient, keeping the cost of the project down. Many projects comply with LEED and Passivehaus standards, and the students do the follow-up work for certification.¹⁹

Rockhill encourages his students to feel comfortable asking questions of the contractor as part of their learning experience. This provides them with the opportunity to collaborate with tradespeople and engage in honest interactions to share knowledge. The goal of the design-build studio is to empower students to become better architects by taking abstract ideas designed on paper and turning them into actual buildings. The aim is for students to graduate feeling empowered by the experience of integrating theory with practice.²⁰

The a+b studio at Deakin University

The a+b studio at Deakin University in Australia has a rich history of working in the context of Geelong and regional Victoria. Since its inception in 1999, the "Urbanheart" studio has initiated a series of ongoing projects with various stakeholders from the City of Geelong and the State of Victoria. In these studios, students collaborate directly with clients to understand regional issues and promote a culture of community involvement. The focus of the projects is less on theoretical concepts and more on providing practical solutions and promoting social activism. Through community-based design-build studios, students have the opportunity to engage directly with the individuals they are designing for, gaining valuable practical experience. The Architecture Program at Deakin University aims to offer students more than just readiness for professional practice, by exposing them to alternative contemporary approaches. This type of Public Interest Architecture involves taking students beyond the confines of the design studio, involving them in local projects, and treating the community as an equal partner in impactful applied research.²¹

18 Dan Kraus and Rockhill, "Work Ethic, Ethical Work" 227

19 Dan Kraus and Rockhill, "Work Ethic, Ethical Work" 227

20 Dan Kraus and Rockhill, "Work Ethic, Ethical Work" 227

21 Yolanda Esteban, John Rollo, and James Doerfler, "The A+B Studio: Contributing Drivers for Change with the City of Greater Geelong 2000–2021," in *Contested Architectural Pasts and Futures of a Regional City, Geelong, Australia*, ed. Mirjana Lozanovska and Ursula de Jong (Cambridge: Cambridge Scholars Publishing, 2024)

Because the a+b studio at Deakin was already invested in community-based projects, the inclusion of design-build as part of the studio offerings was a compliment to this stream. Design-build becomes a new method of working with community groups and communities in need to provide design services and explore options for improving the built environment. In some ways, design-build is an academic-professional bridge providing vehicles to introduce integrated building practices and explore complex solutions for sustainability. The ability to embrace the complexity emulates professional experience.

The design-build structure involves dividing the studio into design and construction phases, fostering a partnership between the university and a non-profit organization or community group. It also entails raising funds and securing donations from vendors, manufacturers, and government agencies for the construction materials. As we have seen in the earlier examples of design-build studios, in these projects, students blend their idealism with active involvement in the community, gathering support and enthusiastically engaging in the project.²²

The Background of the Prefab 21 Partnership Provides the Necessary Factors for Design-Build

FormFlow is an Australian company that developed innovative building products to address housing affordability, accessibility, and sustainability. They focus on reducing the carbon footprint of homes through technology, using recycled and recyclable materials, and sustainable practices. They employ Industry 4.0 and lean manufacturing principles to minimize construction waste and maximize social impact. The company started at the business incubator Manufutures, at Deakin University.²³

Samaritan House Geelong is a not-for-profit organization providing crisis accommodation and support for homeless men in the Geelong Region. Over the last twelve years, they have provided accommodation for over 600 men, with more than 50% transitioning to permanent housing. They are now focusing on building Independent Living Units (ILUs) to help homeless men transition to self-sufficiency and break the cycle of homelessness by providing affordable rent in supported accommodation for a period of time. Samaritan House planned to develop seven single-bedroom units to comply with planning regulations for the site.²⁴

The Prefabricated House in the 21st Century (Prefab 21) design studio was established through a collaboration with FormFlow to explore their innovative process of bending corrugated steel cladding. FormFlow approached the School of Architecture and Built Environment to engage

22 Esteban, Rollo, and Doerfler, "The A+B Studio".

23 Esteban, Rollo, and Doerfler, "The A+B Studio".

24 Esteban, Rollo, and Doerfler, "The A+B Studio".

architects in a design/build project using their unique method of bending corrugated steel. At the same time, Samaritan House was in discussions with FormFlow to develop a housing prototype for their facility. This presented an opportunity to bring the three parties together to create a design/build project, with Deakin architecture students working alongside FormFlow as the builder and Samaritan House as the client to produce a prototype prefabricated Independent Living Unit (ILU). This interdisciplinary project came to fruition through design studio and workshop sessions, resulting in the design, documentation, and construction of an ILU, as well as the establishment of a microvillage comprising seven ILUs at Samaritan House.²⁵

Creating a new design-build program at a university can be a challenging process. There are many questions to be answered during the initial weeks of the process as the project is being developed. Most importantly, the project itself should have a few factors that are aligned to be able to move forward. The project should have a client or sponsor that provides the funding to ensure it is not just a paper project. In addition, the client should have a site and be familiar with the local government approval process for building the project. In this project, we had these factors aligned. The client had funding for one prototype, a site for the development, and planning approval for future development.

The second aspect that is needed for the design-build project is the academic side of the project. The design studio format gives the project structure and an appropriate degree of priority in the student's class schedule. Design studio courses are usually double the credit and four times the time of a typical class. The demands of developing the project with interactive sessions are considered normal methods in the design studio. In addition, the instructor guiding the class should have some experience doing design-build projects and/or similar professional experience. It is important to establish a critical path strategy to be able to meet the required outcomes in the timeframe.

The third aspect needed for design-build projects is a relationship with a builder or someone who will manage construction. This can be the instructor or the instruction team, or it can be a qualified builder. In the case of this project, our goal was to provide a design for a prototype for a prefabricated house, which has a degree of specialist knowledge. Our partner, FormFlow, had all the needed factory space, construction safety regimens, knowledge of prefab structures, and skilled labor and machinery to guide this aspect of the project.

Our client and industrial partner were eager to move forward with the project within a 12-week timeframe aligned with the academic semester. Without the support to operate within this tight schedule, achieving completion would have been challenging. The collaboration of these three partners supplied the essential resources and capabilities to advance the project.

25 James. Esteban, Rollo, and Doerfler, "The A+B Studio".



Research and Interactive Design-Build Process

Samaritan House Geelong, as the client, had a clear vision of providing medium-term transitional accommodation through the Independent Living Unit (ILU) and working alongside their guests to transition to a better and stable future. This pioneering Independent Living Unit project in the region offers homeless men the opportunity to experience self-sufficiency through affordable rent in supported accommodation for a specified period, enabling them to transition to their own independent public or private housing and break the cycle of homelessness. The development of this new housing type involved an interactive process that included investigating sustainability, user experience, and social and economic awareness in providing transitional housing for the homeless. This project extends beyond the homeless shelter, with the ILU and microvillage design enabling better access to affordable housing, increasing housing equity in the community, and providing a pathway for the homeless to reintegrate into society.²⁶

The project began with an in-depth exploration of historical and modern prefabrication methods by the students. FormFlow, our manufacturing partner, delivered insightful presentations on their prefabricated house philosophy and manufacturing approach. To ensure active participation in the design process, the studio implemented a specific design procedure that unfolded in stages. The initial stage involved individual work, during which each student formulated a design

26 James. Esteban, Rollo, and Doerfler, "The A+B Studio".

[Fig. 1]
Samaritan House ILU: design review

[Fig. 2]
Samaritan House ILU: Client and Student interaction

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proposal based on the initial briefing from Samaritan House. This approach fostered a sense of ownership among the students, as each one contributed to identifying the most suitable design.

After reviewing the design proposals students, faculty, and partners voted on the design that fulfilled the goals of the studio and had high aesthetic merit. Based on the voting, two designs moved forward to the next stage. The students were now grouped into teams that included the designer of the chosen projects and students who gravitated to that design through the voting process. Or had similar features in their design that they could develop in the next stage. Some students were particularly engaged in the site design and landscape integration of the project. These students formed another team whose goal was to develop the site design for the microvillage on the Samaritan House property.

Following another round of development, presentation, and voting to select the preferred design, the final stage of the design process encompassed various parallel and simultaneous aspects. In close collaboration with FormFlow, the student team delivered a prefabricated system design that is both innovative in material and fulfills the client's requirements. The initial goals were established collectively by the students, FormFlow, and Samaritan House. Subsequently, the students provided the design and documentation to meet these objectives for the prefabricated system. Operating as a cohesive design and construction team, the group emulated a professional design process, engaging with builders and clients every week to bring the project to fruition. The functionality, form, and sustainability objectives that were developed for the project guided the creation of a distinctive exterior shape that prioritizes passive high performance.²⁷

The non-technical interactions involved design reviews with various stakeholders, including HOME, the Deakin University-wide research group aimed at providing a home for everyone, and Sustainability Geelong. The students visited Samaritan House, where they interviewed staff and guests to better understand their needs. This first-hand knowledge helped the students gain an understanding of the necessary functions for the ILU and contributed to its success.²⁸

The students provided design drawings that included 3D modeling, detailing, structure, screw-pile foundations, energy studies, material choices and life-cycle investigation, modular construction strategies, and construction sequencing. The student team worked closely with the engineers and builders at FormFlow, who translated the design into the BIM models that

²⁷ James. Esteban, Rollo, and Doerfler, "The A+B Studio".

²⁸ James. Esteban, Rollo, and Doerfler, "The A+B Studio".

[Fig. 3]

Samaritan House ILU: FormFlow factory visit

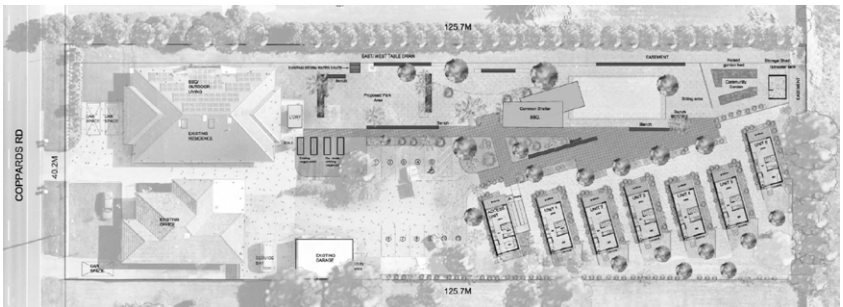
[Fig. 4]

Samaritan House ILU: FormFlow and student interaction



determined how the buildings would be constructed. The site design team worked in parallel, was aware of the design development of the ILU, and consulted with Landscape Architecture faculty on the landscape elements. The first ILU prototype was designed and built in 12 weeks.

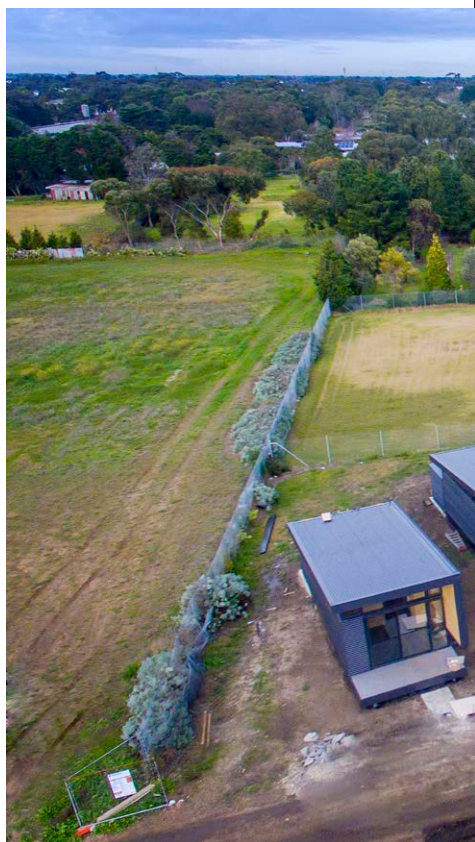
The majority of the construction fell on the manufacturer, FromFlow to coordinate and build. Half the students participated in building, and becoming part of the workforce in the FormFlow factory. The final weeks of construction were interrupted by the first of the lockdowns related to the pandemic. Compliance with the lockdown requirements limited the size of the crew that could work in the factory. The lockdowns put constraints on student participation.



[Fig. 5]
Samaritan House Microvillage Landscape Design Plan



[Fig. 6]
Samaritan House Microvillage: installation of prefab units



[Fig. 7]
Samaritan House Microvillage Aerial View





[Fig. 8]
Samaritan House ILU: interior, kitchen

The Prefab 21 team had project goals that focused on providing shelter and addressing the region's housing affordability crisis. They also aimed to reduce the carbon footprint of future homes, minimize waste through lean manufacturing principles, and utilize recycled/recyclable materials in a prefabricated and modular design, implementing a circular economy strategy. The student-designed ILU explores and tests the next generation of house design and manufacturing for the 21st Century. It demonstrates the industry partners' unique material technology and proves that prefabricated modular construction works for social housing. Collaboration between industry and university in research provides an opportunity to question and effectively test new experiments. This project serves as a model for design-build transdisciplinary projects that can transform how architecture students are taught, embracing an experimental and experiential culture. It also aims to positively engage communities, increase housing equity, and provide access to beautiful and functional sustainable housing.

The ILU prototype served as evidence to apply for and obtain grants from both the City and State, enabling the construction of a seven-unit microvillage. This successful prototype will provide essential support to address the homelessness challenges in the Geelong region. Its significance lies in introducing a new model for transitional homeless accommodation and job opportunities in the area.²⁹

Learning Outcomes of the Project

The student experience started from an abstract representation of the project on the computer screen to a scaled model, scaled drawings, and ultimately a full-size building is a process that few students have participated in. Some students had realizations about the project being much smaller or larger than they envisioned. This project created a reference for their future professional lives being able to judge size, materials and construction, spatial qualities, and natural light in later projects.

Design-build projects provide holistic student experiences that are lacking in traditional architecture education. Design-build combines theory and practice, drawing and building, empathy, and social engagement. Students and clients develop a higher level of understanding and empathy for each other. They had a deeper understanding of their respective backgrounds and personal challenges.

During the course of the design-build studio the students were learning soft skills. Clear, concise emails to non-architects, phone etiquette, follow up communications with stakeholders, being prepared for meetings and taking useful notes were a few of the unexpected learning outcomes of the studio. These skills are valued by employers and give students additional personal tools to explain their work to different audiences.

²⁹ James, Esteban, Rollo, and Doerfler, "The A+B Studio".

In surveys that were taken after the end of the semester, the students recognized that they learned about the homeless community, prefabricated homes, and the design-build process. One other important takeaway was they learned about working on teams with the extensive group work that occurred in the studio. They emphasized communication skills, the ability to delegate, knowledge of their strengths and weaknesses, and the advantages of working with fellow students with different abilities than themselves.

The community-based design-build studio requires interaction between students, instructors, and stakeholders. In his book, *The Craftsman*, Richard Sennett describes stages of experience on the road to expertise as guided by masters, experts, and people with expertise mentoring aspiring craftsmen. This process includes researching the problem and building on previous learning experiences, developing analytical powers, following a linear progression developing tools or skillsets through repetition and slow revisions, and engaging the imagination to discover new outcomes, building pragmatic skills through practice. The final stage of mastering a skill involves putting what has been learned into practice.³⁰ This includes being able to measure success, reflecting on what constitutes good practice, and maintaining a high level of professionalism and quality. These studios also provide a form of mentorship, where students are guided by the "masters" through the process, emulating good practice. In some ways, this mentorship also allows the "masters" to give back to their community or profession. A project infused with changing or improving something for the better affecting lives in the community provides the student, instructor, and stakeholder with an extra drive to change the world.

Sennett discusses the concept of two kinds of experience underlying Dewey's pragmatist philosophy. One aspect is that a pragmatist experience makes an internal emotional impression. The other aspect is that experience uses or encourages skills that have an external impact. The nature of community-based design-build projects combines both sides of Sennett's pragmatism. The students are affected by an emotional and personal response to community-based projects. The student feels a need to contribute or provide an ethical response to helping or contributing to the public good. The second aspect of engaging skill-based experience is created by the process of completing a design-build project. This focuses on the craft of creating and the value of the experience it provides. Hence, the *Practice* of architecture is the repetition and skill building that is required to become a professional.³¹ The community-based design-build studio is an example of pragmatist pedagogy.

Architecture needs to continue to engage in dialogue with community groups, non-profits, and individual stakeholders that are impacted by our work. Public Interest Design and Design-Build is a complement to traditional design education. Design-Build educators value interactive ideation

³⁰ Richard Sennett, *The Craftsman* (New Haven, CT: Yale University Press, 2008).

³¹ Sennett, *The Craftsman*

and the development and execution of the physical project. The interaction with the client/ community, the site, and the constraints of the project all combine to enrich the learning by making shared goals for the project. As Sennett suggests "the craft making of physical things provides insight into the techniques of experience that can shape our dealings with others."³²

Architects must not just discuss community-engaged design amongst ourselves but include others in the conversation to make the built environment better. It is important to include diverse stakeholders such as planners, developers, community leaders, critics, bankers, and others with opinions about the environment. Otherwise, we can create an echo chamber and limit our solutions. We need a holistic discussion of how we can support the academic/ professional/stakeholder partnerships, the research, innovation, and experimentation that comes out of these projects, and the potential effects these community-engaged design-build projects have on the community.

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